HEATCRAFT™ Worldwide Refrigeration

PRO³™ Refrigeration System Installation

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PRO³™

Refrigeration System

For Indoor Applications

Installation and Operation Guide

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Performance / Electrical Data

Table 1. COOLERS — Air Defrost Systems

PRO³ Model Number	BTUH @ 95° F. 35° F. Box Temp	BTUH @ 95° F. 38° F. Box Temp	Voltage	MCA	MOPD	Unit Amps	Evap CFM	Matching Plug Supplied	NEMA Receptacle	Fig.
PTN024H2A	2,540	2,650	115/1/60	10.2	15	10.2	340	Yes	5-20R	A
PTN029H2A	3,070	3,180	115/1/60	10.6	15	10.6	340	Yes	5-20R	A
PTN040H2A	4,240	4,350	115/1/60	11.7	15	11.7	340	Yes	5-20R	A
PTN047H2A	4,980	5,300	115/1/60	16.9	20	14.2	350	Yes	5-20R	B
PTN047H2B	4,980	5,300	208-230/1/60	8.6	15	7.3	350	Yes	6-15R	B
PTN063H2B	6,680	7,100	208-230/1/60	9.8	15	9.9	550	Yes	6-15R	B
PTN072H2B	7,630	8,060	208-230/1/60	10.9	15	9.3	500	Yes	6-15R	B
PTN099H2B	10,490	11,340	208-230/1/60	17.1	20	14.7	875	Yes	6-20R	C
PTN099H2C	10,490	11,340	208-230/3/60	14.7	20	13.3	875	No	—-	C
PTN128H2B	13,570	14,520	208-230/1/60	20.1	30	17.2	825	No	—-	C
PTN128H2C	13,570	14,520	208-230/3/60	14.1	20	12.8	825	No	—-	C

Table 2. FREEZERS — Electric Defrost Systems

PRO³ Model Number	BTUH @ 95° F. 0° F. Box Temp	BTUH @ 95° F. -10° F. Box Temp	BTUH @ 95° F. -20° F. Box Temp	Voltage	MCA	MOPD	Unit Amps	Evap CFM	Plug Supplied	Matching NEMA Receptacle	Fig.
PTN019L6A	2,470	1,850	N/A	115/1/60	13	20	13	340	Yes	5-20R	A
PTN021L6A	2,680	2,160	1,340	115/1/60	14.5	20	12.3	350	Yes	5-20R	B
PTN021L6B	2,680	2,160	1,340	208-230/1/60	7.6	15	6.5	350	Yes	6-15R	B
PTN031L6B	4,220	3,190	2,060	208-230/1/60	13.8	15	11.6	550	Yes	6-15R	B
PTN044L6B	5,870	4,530	3,400	208-230/1/60	15.9	20	13.3	520	Yes	6-20R	B
PTN052L6B	7,000	5,360	3,910	208-230/1/60	18.1	20	15.5	900	Yes	6-20R	C
PTN052L6C	7,000	5,360	3,910	208-230/3/60	15.0	15	11.3	900	No	—-	C
PTN069L6B	9,060	7,100	5,250	208-230/1/60	23.8	30	20.0	875	No	—-	C
PTN069L6C	9,060	7,100	5,250	208-230/3/60	15.9	20	14.2	875	No	—-	C

Table 3. Specifications

PRO³ Model	Refrigerant	Refrigerant Chg. (oz.)	Total Heat of Rejection (BTUH)	Approx. Net Weight Lbs.	Kg
		COOLERS			
PTN024H2A	22	12	3,000	88	43
PTN029H2A	22	16	3,800	90	43
PTN040H2A	22	14	5,500	92	43
PTN047H2A	22	27	6,700	192	100
PTN047H2B	22	27	6,700	192	100
PTN063H2B	22	29	8,700	207	100
PTN072H2B	22	32	9,700	211	100
PTN099H2B	22	47	16,800	270	127
PTN099H2C	22	47	16,800	265	127
PTN128H2B	22	52	18,000	290	127
PTN128H2C	22	52	18,000	285	127
		FREEZERS			
PTN019L6A	404A	14	4,000	101	43
PTN021L6A	404A	26	4,300	213	100
PTN021L6B	404A	26	4,300	213	100
PTN031L6B	404A	28	6,300	221	100
PTN044L6B	404A	29	9,900	225	100
PTN052L6B	404A	45	10,900	275	127
PTN052L6C	404A	45	10,900	270	127
PTN069L6B	404A	47	15,300	280	127
PTN069L6C	404A	47	15,300	275	127

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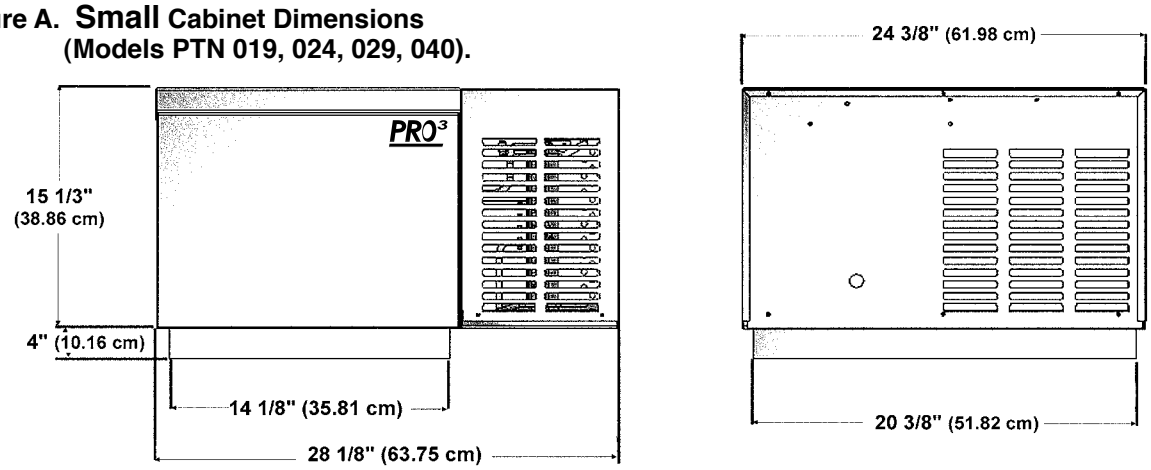
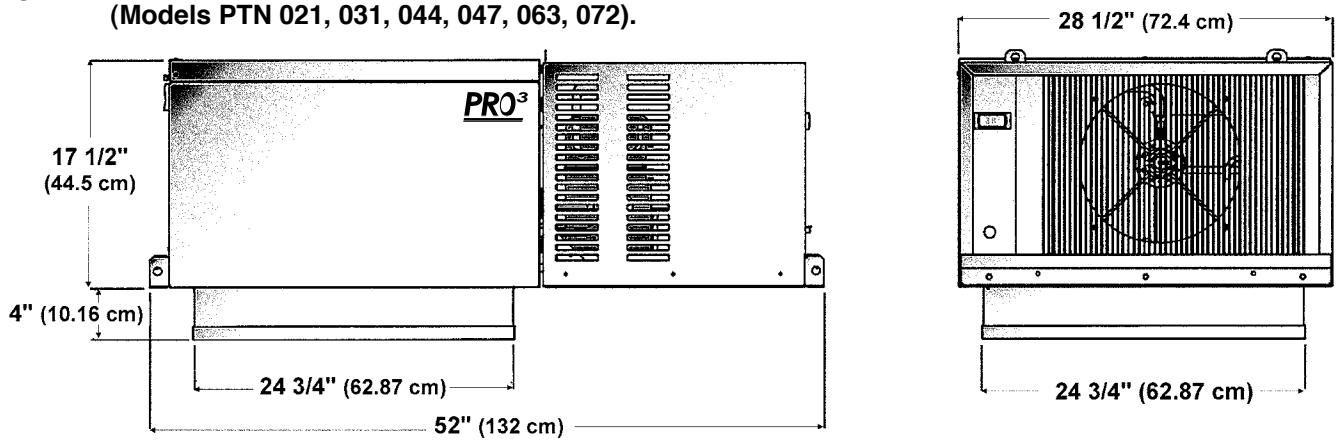
Dimensional Diagrams

Figure A. Small Cabinet Dimensions (Models PTN 019, 024, 029, 040).



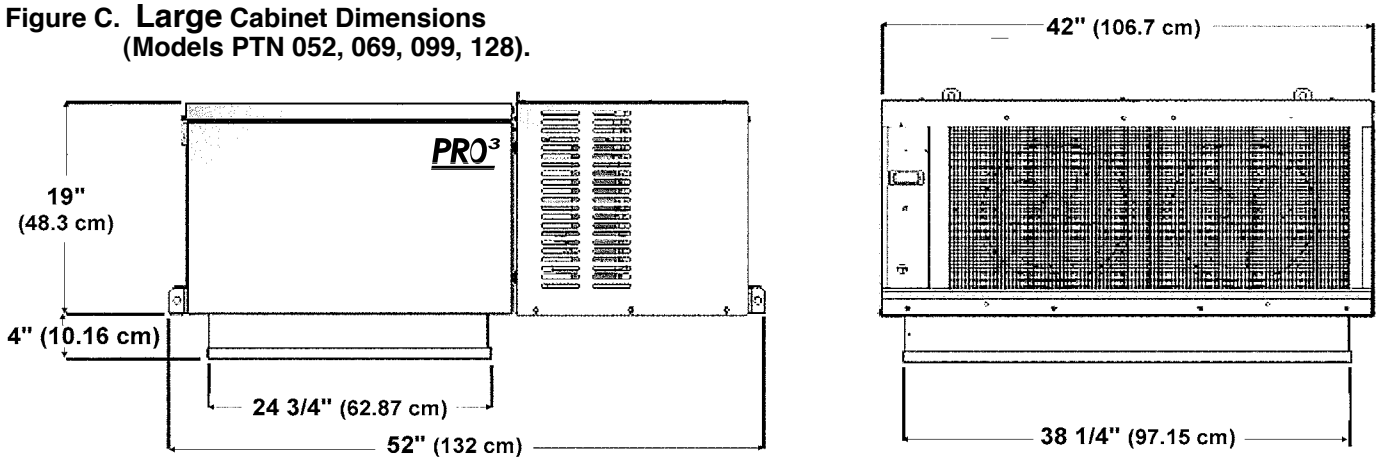
14 1/2" x 20 3/4" panel opening required for evaporator section of small cabinet sizes.

Figure B. Medium Cabinet Dimensions (Models PTN 021, 031, 044, 047, 063, 072).



25" x 25" panel opening required for evaporator section of medium cabinet sizes.

Figure C. Large Cabinet Dimensions (Models PTN 052, 069, 099, 128).



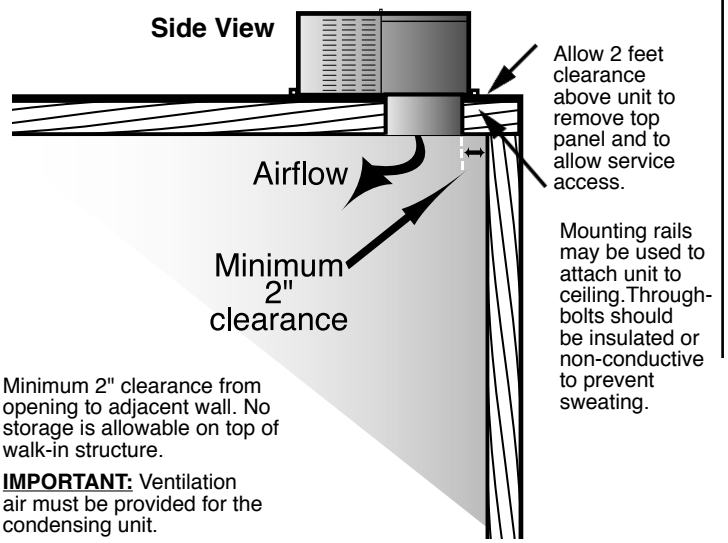
25" x 38 1/2" panel opening required for evaporator section of large cabinet sizes.

Space and Location Requirements For PTN models.

The most important consideration which must be taken into account when deciding upon the location of air-cooled equipment is the provision for a supply of ambient air to the condensing unit. Ignoring this essential requirement will result in higher condensing pressure and contribute to poor operation or potential equipment failure. Units must not be located in the vicinity of steam, hot air or fume exhausts. Adequate air circulation through the condensing unit is critical to ensure proper equipment operation. Improper installation can damage the unit and will void the warranty. PRO³ penthouse-style packaged units are designed for **indoor use only** in ambient temperatures of 50°F to 100°F. The unit cabinet is not approved for weather tight applications.

Another important consideration is that the unit should be mounted away from noise sensitive spaces and must have adequate support to avoid vibration and noise transmission into the building. Storage should not be allowed on top of walk-in structure. Unit must not be enclosed in an unventilated space.

Figure 1. PRO³ System Space and Location Requirements for PTN models


Side View
Airflow
Minimum 2" clearance
Allow 2 feet clearance above unit to remove top panel and to allow service access.
Mounting rails may be used to attach unit to ceiling.Through-bolts should be insulated or non-conductive to prevent sweating.

Minimum 2" clearance from opening to adjacent wall. No storage is allowable on top of walk-in structure.

IMPORTANT: Ventilation air must be provided for the condensing unit.

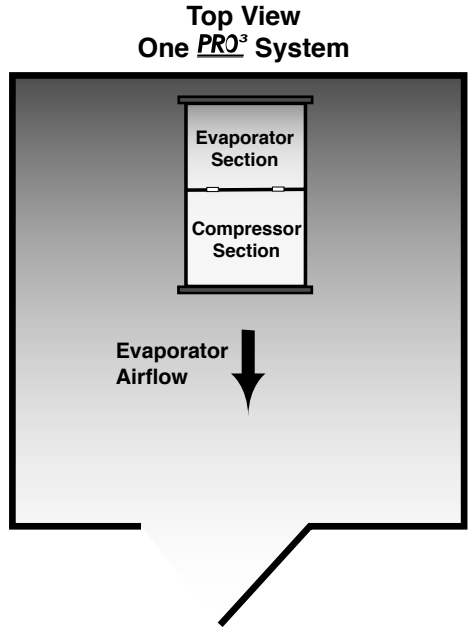
Structure must not be masked to building ceiling, blocking air flow to unit.

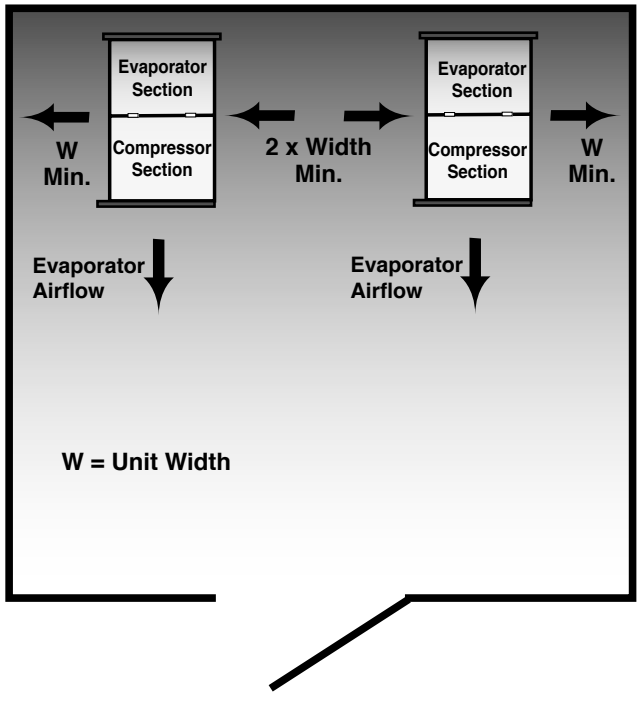
Recommended Unit Placement

Some general rules for the evaporator section placement which must be followed are:

1. Ensure that the structural integrity of the box can withstand the weight of the top mounted equipment.
2. The air pattern must cover the entire room.
3. **NEVER** locate the evaporator section over doors.
4. Location of aisles, racks, etc. must be known.
5. Never remove or unlock any panel cam-locks to install top mounted equipment.

The size and shape of the storage will generally determine the type and number of units to be used and their location.





Top View
Two PRO³ Systems

PTN Models

Multiple units must be spaced properly to provide adequate air circulation.

NOTE: Always avoid placement of units directly above doors and door openings.

Rigging

Rigging holes are provided on all models. Caution should be exercised when moving these units. To prevent damage to the unit housing during rigging, cables or chains used must be held apart by spacer bars. The mounting platform or base should be level and located so as to permit free access of supply air.

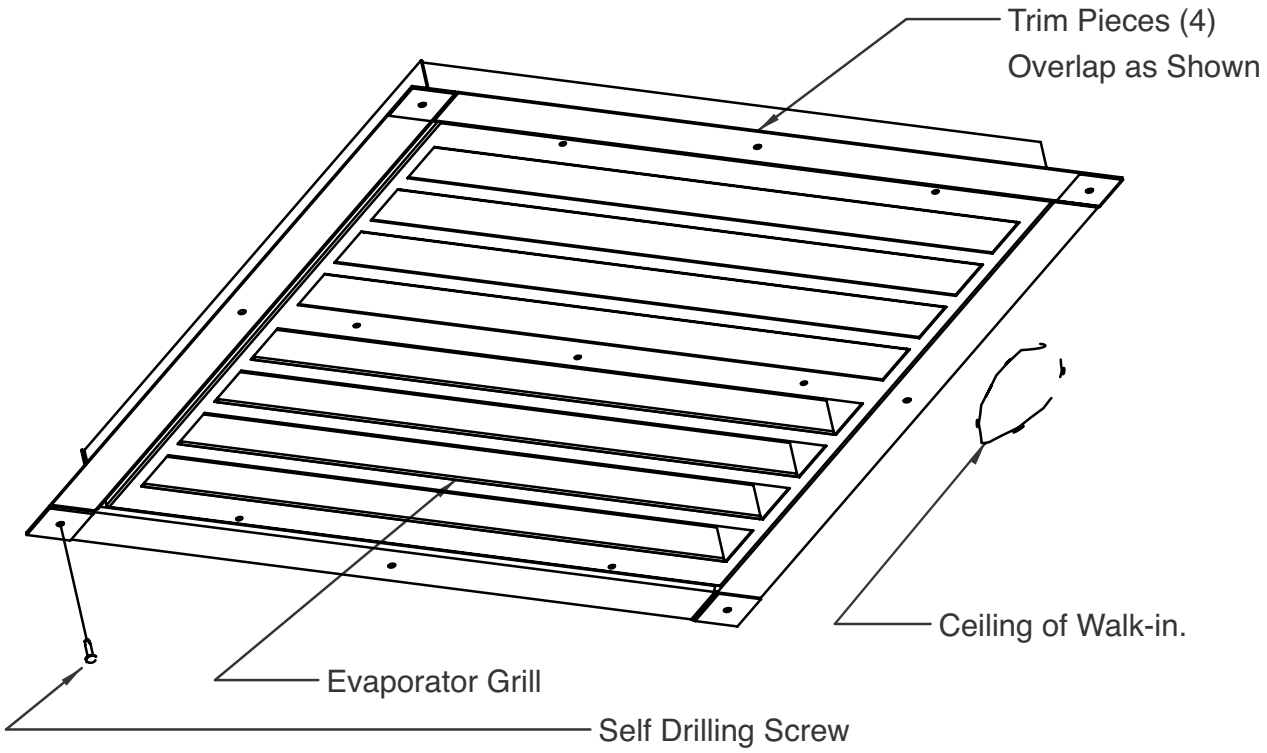
Access Requirements

Provide adequate space at the compressor end of the unit for servicing. Provide two (2) feet of space above unit for service.

Mounting

The system requires an opening in the ceiling to the dimensions stated on page 3. Mounting rails are located at both ends of the chassis. Mounting rails may be used to attach unit to ceiling. Through-bolts should be insulated or non-conductive to prevent sweating. The chassis is weather stripped around the air grille and will seal to the box roof. The trim ring (shipped loose), when provided, should be installed around the air diffuser when secured with the hardware provided. Be sure to adhere to your local standard construction codes.

Trim Ring Installation Detail



Inspection

1. Each shipment should be carefully checked against the bill of lading.
2. The shipping receipt should not be signed until all items listed on the bill of lading have been accounted for.
3. Check packaging for signs of damage.
4. Any shortage or damages should be immediately reported to the delivering carrier.
5. Damaged material becomes the delivering carrier's responsibility, and should not be returned to the manufacturer unless prior approval is given to do so.
6. When unpacking the system, care should be taken to prevent damage.
7. Avoid removing the shipping base until the unit has been moved to the final destination.
8. Complete warranty return card for each unit and mail to Heatcraft Refrigeration Products.

General Safety Information

1. **Installation and maintenance to be performed only by a licensed contractor**.
2. Ensure that the structural integrity of the box can withstand the weight of the ***PRO³*** (See page 2, Table 3 for unit weights).
3. Avoid contact with sharp edges and coil surfaces. They are a potential injury hazard. Wear gloves during moving and rigging.
4. Make sure all power sources are disconnected before any service work is done on units.

Standard Installation Procedure

PTN Models

For Indoor Use Only

1. Inspect packaging for shipping damage. Open package and inspect unit for concealed damage.
2. Review the space and location requirements on page 5.
3. Provide a finished opening in the box ceiling, to the appropriate dimensions and structural strength as stated on page 2, Table 3.
4. DO NOT remove or disengage any box cam-locks in order to install the ***PRO³*** unit.
5. Clean the roof of the box to provide a good sealing surface for the unit weatherstrip. Refer to box manufacturer's instructions for any procedures or processes necessary to ensure the integrity of the exposed foam in the panels is not compromised.
6. Check the mounting surface with a level. ***PRO³*** units require a surface that is within 1° of level or better and no more than a 5/8" drop per 3 feet (17mm drop per meter).
7. For walk-in boxes with aluminum top panels, it is recommended that a thermal break be placed on the roof adjacent to the opening to prevent the possibility of sweating.
8. Place the unit gently into the provided opening with the evaporator air flow directed toward the door (See page 5). Be careful not to damage the grill during installation.
9. Ensure that the condenser air flow is not obstructed.
10. Install the trim around the inside opening with the hardware provided.
11. Connect unit to power supply using the cord with plug, if provided, or hard wire. Adhere to local electrical/wiring codes.

IMPORTANT:
- **Do not use extension cords to connect unit to power.**
- **Plug-in to grounded three prong outlet.**
- **Do not remove grounding prong.**
- **Do not use a power adapter.**

12. Apply power to unit. **All controls are preset to factory default settings** (See Table 4).
13. Check unit for proper operation.
14. The correct time of day may be programmed on medium and large cabinet freezer systems (See page 11 for instructions).

Table 4. Control Factory Default Settings

PTN Models	Temperature Set Points	Defrost Start Times	Defrost Duration (Maximum)	Drip Time	Fan Delay	Defrost Termination Set Point
Cooler Models						
All cabinet sizes	35°F	3 / day	n/a	---	---	38°F
Freezer Models						
Med. & Lg. cabinet	-10°F	4:00 AM, 10:00 AM, 4:00 PM, 10:00 PM	40 min.	2 min.	2 min.	65°F
Small cabinet	0°F	4 / day	20 min.	---	---	Time only

Medium and Large Cabinet Freezers

PRO³ Service Information

All PRO³ units are designed for maximum durability, reliability and simplicity. PRO³ comes to you ready for operation, fully charged and with all controls preset at the factory. Instructions for setting the proper time of day on the freezer defrost/ temperature control are on page 11, steps 1 through 6. The following information is provided as an aid in the event that service is required.

Maintenance

The evaporator section of a PRO³ system should be checked at least once for proper defrosting because the amount and pattern of frosting can vary greatly. The frost build-up is dependent on the temperature of the room, the type of product being stored, how often new product is brought into the room and percentage of time the door to the room is open. It may be necessary to periodically change the number of defrost cycles or adjust the duration of defrost.

PRO³ System Standard Maintenance Guidelines

After first year of operation and under normal usage, maintenance should cover the following items at least once every six months:

1. Check and tighten **ALL** electrical connections.
2. Check all wiring and insulators.
3. Check contactors for proper operation and for worn contact points.
4. Check all fan motors. Tighten motor mount bolts/ nuts and tighten fan set screws.
5. Clean the condenser coil surface.
6. Check the operation of the control system. Make certain all safety controls are operating properly.
7. Check that all defrost controls are functioning properly.
8. Clean the evaporator coil surface.
9. Clean the drain pan and check the drain pan and drain line for proper drainage.

Sequence of Operation

1. Power is provided to the temperature control, compressor contactor and cooler evaporator fans.
2. The temperature controller closes and energizes the compressor contactor, starting the compressor, evaporator and condenser fan(s).
3. When the system reaches the desired box temperature, the temperature control will de-energize the compressor contactor. Evaporator fans will continue to operate at this point.
4. When the fixture temperature rises above the set point and minimum off-time has elapsed, the temperature control will close and re-energize the compressor contactor.

Freezer Defrost Control - Med. & Large Cabinet

Freezer units utilize an electronic temperature/defrost control. This control is fully preprogrammed for temperature and defrosts. Instructions for any necessary reprogramming are included in this manual on page 11-13.

Any of the parameters can be modified and the changes will be stored in the non volitile memory. A capacitor is used to maintain the time-of-day for up to 100 hours during power outage.

Electric Defrost Sequence of Operation for Freezers

1. During normal operation, at the preset times of day, the temperature/defrost control will de-energize the compressor contactor and evaporator fans and energize the defrost heaters. These functions are controlled through relays on the controller.
2. When the coil has defrosted fully and has reached the preset coil temperature (as sensed by the coil temperature sensor) the defrost heater de-energizes and the fan delay and drip sequences begin.
3. The temperature/defrost control energizes the compressor contactor, starting the compressor and condenser fan(s).
4. Freezer evaporator fans will be energized by the temperature/defrost control when the coil temperature reaches 35°F or fan delay time has elapsed.

Programming PRO³'s Electric Defrost Controls

PRO³'s electric defrost control factory settings can be found on page 4 of this manual.

The control panel initially powers up displaying 12:00 AM otherwise it will show the last configured selection (time or temperature). If a power outage occurs during normal operation, the control will maintain the correct time-of-day up to 100 hours.

To initiate a **Manual Defrost**, press and hold the **MAN DEF** key for 3 seconds.

There are two levels of programming in the controls. The first level of security will enable the user to set two parameters:

- Time-of-day (CLoC)
- Setpoint temperature (SEt)

The other level allows access to the other parameters.

Three buttons are used for the programming:
SET, UP and DOWN.

Figure 5. Controls for Medium and Large Cabinets

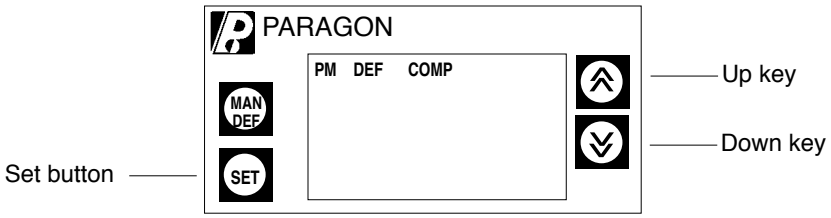


Table 5. Changing time-of-day and setpoint temperature (First Level)--follow these steps:

Step 1	SET	Press and hold SET for 5 seconds. The display will show CLoC
Step 2	SET	Press SET again to change the time-of-day
Step 3	⌃⌃ or ⌄⌄	Press UP or DOWN until the correct time-of-day is displayed
Step 4	SET	Press SET to accept the new time
Step 5	⌄⌄	Press DOWN to go to the next parameter — Setpoint Temperature will display — SET (cut out)
Step 6	SET	Press SET to change the setpoint temperature
Step 7	⌃⌃ or ⌄⌄	Press UP or DOWN to go to the desired setpoint. The range is -40°F to 60°F or -40°C to 15°C
Step 8	SET	Press SET to accept the change
Step 9	⌄⌄	Press DOWN to exit the first level of programming

NOTE: During programming, if no button is pushed during 30 seconds, the control will go back to the normal operating mode. This is valid for both programming levels.

Table 6. Changing other parameters (Second Level)-- follow these steps:

Step 1	SET and ⌄⌄	Press and hold SET and DOWN for 10 seconds. The display will show dSPL
Step 2	SET	Press SET to change the parameter
Step 3	⌃⌃ or ⌄⌄	Press UP or DOWN to change the options, time or temperature for the current parameter
Step 4	SET	Press SET to accept the new value
Step 5	⌄⌄	Press DOWN to go to the next parameter, then go back to Step 2. After the last parameter is displayed (ALHi), the display will go back to the normal operating condition.

NOTE: To scroll down the parameters without changing them, press the DOWN button.

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Table 7. List of Parameters for Freezers

Here is a list of the parameters that can be changed in the Second Level of programming, as well as their options and ranges.

Parameter	Display Symbol	Default	Description	Range / Options
Display Status	dSPL	CyCL	Information shown on the display during operation conditions	tdAy — time-of-day rSP° — zone temperature (refrigerated space) CyCL — cycle between time and zone temperature Epr° — evaporator coil temperature
Clock Format	CLHr	12 hours	Format of the time (12 or 24 hours mode)	12Hr — AM/PM format 24 Hr — 24-hours format
Temperature Format	°dSP	°F	Temperature degrees	°F — degrees Fahrenheit °C — degrees Celsius
Defrost Type	dFtP	Electric	Type of defrost used in the application	ELEC — electric heater defrost/off cycle * HgAS — hot gas
Fan Status During Defrost	EFAN	No	Enable or not the fan during defrost	no — fan is turned off during defrost yES — fan remains on during defrost
Defrost Interval	dFin	Time of Day	Type of defrost interval	TdAy — time-of-day setpoint * CPrn — compressor run time * tdEF— temperature initiated
Minimum Compressor Off Time	CoFF	4 minutes	Minimum time that the compressor will remain turned off	Range: from 0 to 15 minutes
Minimum Compressor On Time	Con	0 minutes	Minimum time that the compressor will remain turned on	Range: from 0 to 15 minutes
Alarm Delay	ALrd	45 minutes	Time delay before the alarm goes off after the temperature fall off the two alarm setpoints	Range: from 0 to 59 minutes
Compressor	CPrn		Time the compressor will run between defrosts	Not Used (0 minutes to 23:59 hours)
Number of Defrosts	nodF	4	Number of defrosts per day	From 0 to 8 (0 means 1 defrost every 48 hours)
Defrost Start Time	dEF1-8	4:00 AM, 10 :00 AM, 4:00 PM, 10 :00 PM	Start time of each defrost	Up to 8 programmable start times
Defrost Duration	dEFd	40 minutes	Defrost duration time (back-up for defrost termination temperature)	Range: from 0 minutes to 4 hours
Fan Delay	FAnd	2 minutes	Delay time for the fan after defrost (back-up for fan cut-in temperature)	Range: from 0 to 15 minutes
Drip Time	driP	2 minutes	Drip time duration	Range: from 0 to 59 minutes
Setpoint Differential	diF°	3°F 2°C	Cut-in temperature differential NOTE: cut-in is cut-out plus differential	Range: from 1° to 25°
Defrost Termination Temperature	dEF°	65°F 18°C	Temperature in the evaporator that will terminate the defrost cycle	Range: from 0°F to 75°F or -18°C to 28°C
Fan Cut-In	FAn°	35°F 2°C	Temperature in the evaporator that will turn the fan on after defrost	Range: from -40°F to 60°F or -40°C to 15°C
Low Temperature Alarm	ALLo	-35°F -37°C	Low temperature setpoint that will make the alarm go off and the error message appear on the display	Range: from -40°F to 83°F to -40°C to 28°C
High Temperature Alarm	ALHi	30°F -1°C	High temperature setpoint that will make the alarm go off and the error message appear on the display	Range: from -40°F to 83°F or -40°C to 28°C

IMPORTANT NOTE: To change from degrees C to F or vice-versa, the user must reprogram all the parameters that are related to the temperature. The unit does not convert the parameters automatically from degrees F to C or vice-versa.

* Not used with ***PRO³***.

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Example — To set one defrost per day at 11:59 PM

- Press and hold SET and DOWN for 10 seconds
- Press DOWN five times to get to go to the Defrost Inverval (**dFIn**)
- Press SET to change the parameter
- Press DOWN until **tdAy** appears on the display
- Press SET to accept the option
- Press DOWN seven times to go to the Number of Defrosts (**noDF**)
- Press SET to change it
- Press UP or DOWN until **1** appears on the display
- Press SET to accept the change
- Press DOWN to go to Defrost Start Time (**dEF1**)
- Press SET to change the time
- Press UP or DOWN until the 11:59 PM appears on the display
- Press SET
- Press DOWN ten times to exit the programming level

Table 8. Error Codes

Display	Control Status
Er 1	ERC Fault — software or hardware failure
Er 2	ERC Communication Fault — indicates that there is a problem with the display module cable
Er 3	Zone Sensor Fault — indicates an open or shorted temperature sensor
Er 4	Evaporator Sensor Fault — indicates an open or shorted evaporator sensor
Er 5	ERC Fault — software or hardware failure
Er 6	Low Temperature Alarm — indicates that the temperature has dropped below the low alarm setpoint
Er 7	High Temperature Alarm — indicates that the temperature has gone above the high alarm setpoint

SENSOR FAILURE: If the zone temperature sensor fails, the control will use the cycle times it recorded for the last three cycles to control the equipment (based on time). Therefore the food will be preserved in case of failure.

If the evaporator sensor opens or fails, the control will terminate the defrost cycle based on time. It is recommended that the evaporator (defrost) sensor be disconnected from the control until a new one can be installed (see page 16, for parts list). This will ensure that the control will terminate the defrost cycle based on time. Always disconnect power before servicing the unit.

For Error Codes 1, 2 and 5 cut the power to the unit and correct the problem to reset the display. For Codes 3 and 4, press the UP or DOWN button on the display to reset the error message. If the display still shows the message, the sensor must be replaced.

The Error Codes 6 and 7 will be automatically reset once the temperature is back within the two setpoints.

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Small Cabinet Freezers

Freezer Defrost Control

The small cabinet freezer models come equiped with a preset mechanical defrost timer.

1. The system will initiate the defrost cycle every six hours after the first one. The first defrost cycle may begin in less than six hours from power up.
2. It will remain in defrost for a period of 20 minutes.
3. Defrost termination is based on time only. After 20 minutes has elapsed the defrost heate will de-energize and the compressor and evaporator fans will energize and begin the cooling cycle.
4. These settings are non-adjustable.

Freezer Thermostat

The small cabinet freezer has a mechanical thermostat which may be adjusted. A "straight up" adjustment knob position is generally correct for a 0°F. box.

All Cooler Models

Cooler Defrost Control

Cooler units utilize an electronic temperature control. The temperature may be adjusted by setting the dial. This control is preset to provide three off cycle defrosts daily. Defrosts are temperature terminated and can not be reprogrammed. The temperature control is programmed for minimum on cycle of one minute and minimum off cycle of four minutes.

Air Defrost Sequence of Operation for Coolers

Air defrost units are preprogrammed for three defrost periods daily. These periods are not reprogrammable. After 71/2 hours, the temperature control will turn the compressor off. When the coil temperature reaches 38°F, the control will terminate the defrost cycle.

Room Thermostat Settings:
• Approximate dial settings of control

0 = Unit off (not an electrical disconnect)
1 = 52°F (11°C)
2 = 49°F (9°C)
3 = 45°F (7°C)
4 = 41°F (5°C)
5 = 38°F (3°C)
6 = 34°F (1°C)

Note: If power is interrupted to the unit during the refrigeration off-cycle (system at temperature setpoint, compressor off), the thermostat will initiate an extra defrost period approximately one hour after power is restored.

Maintenance

The evaporator section of a PRO³ system should be checked at least once for proper defrosting because the amount and pattern of frosting can vary greatly. The frost build-up is dependent on the temperature of the room, the type of product being stored, how often new product is brought into the room and percentage of time the door to the room is open.

PRO³ System Standard Maintenance Guidelines

After first year of operation and under normal usage, maintenance should cover the following items at least once every six months:

1. Check and Tighten **ALL** electrical connections.
2. Check all wiring and insulators.
3. Check contactors for proper operation and for worn contact points.
4. Check all fan motors. Tighten motor mount bolts/ nuts and tighten fan set screws.
5. Clean the condenser coil surface.
6. Check the operation of the control system. Make certain all safety controls are operating properly.
7. Check that all defrost controls are functioning properly.
8. Clean the evaporator coil surface.
9. Clean the drain pan and check the drain pan and drain line for proper drainage.

Table 9. PRO³ System Troubleshooting Chart

PROBLEM	POSSIBLE CAUSES	POSSIBLE CORRECTIVE STEPS
Compressor will not run	1. Main switch open.	1. Close switch.
	2. Fuse blown.	2. Check electrical circuits and motor winding for shorts or grounds. Investigate for possible overloading. Replace fuse after fault is corrected.
	3. Thermal overloads tripped.	3. Overloads are automatically reset. Check unit closely when unit comes back on line.
	4. Defective contactor or coil.	4. Repair or replace.
	5. System shut down by safety devices.	5. Determine type and cause of shutdown and correct it before resetting safety switch.
	6. No cooling required.	6. None. Wait until calls for cooling.
	7. Motor electrical trouble.	7. Check motor for open windings, short circuit or burn out.
	8. Loose wiring.	8. Check all wire junctions. Tighten all terminal screws.
Compressor noisy or vibrating	1. Flooding of refrigerant into crankcase.	1. Check setting of expansion valves.
	2. Worn compressor.	2. Replace.
High discharge pressure	1. Non-condensables in system.	1. Remove the non-condensables.
	2. Fan not running.	2. Check electrical circuit. Replace if motor fails.
	3. Dirty condenser coil.	3. Clean.
	4. System overcharged with refrigerant.	4. Reclaim refrigerant and recharge proper amount.
Low discharge pressure	1. Insufficient refrigerant in system.	1. Check for leaks. Repair and add charge.
	2. Low suction pressure.	2. See corrective steps for low suction pressure.
High suction pressure	1. Excessive load.	1. Reduce load or add additional equipment.
	2. Expansion valve overfeeding.	2. Check remote bulb. Regulate superheat.
Low suction pressure	1. Lack of refrigerant.	1. Check for leaks. Repair and add charge (see refrigerant charge chart).
	2. Evaporator dirty or iced.	2. Clean.
	3. Expansion valve malfunctioning.	3. Check and reset for proper superheat.
	4. Condensing temperature too low.	4. Check ambient temp, 50°F to 100°F.
Compressor thermal protector switch open	1. Operating beyond design conditions.	1. Add equipment so that conditions are within allowable limits.
	2. Dirty condenser coil.	2. Clean coil.
	3. Overcharged system.	3. Reduce charge (see refrigerant charge).
Fan(s) will not operate	1. Main switch open.	1. Close switch.
	2. Blown fuses.	2. Replace fuses. Check for short circuits or overload conditions.
	3. Defective motor.	3. Replace motor.
	4. Defective defrost control.	4. Replace defective component.
	5. Unit in defrost cycle.	5. Wait for completion of cycle.
	6. Coil does not get cold enough to reset thermostat	6. Adjust fan delay setting of control. See Defrost Section page 8.
Room temperature too high	1. Control cut out set too high.	1. Adjust control.
	2. Superheat too high.	2. Adjust thermal expansion valve.
	3. System low on refrigerant.	3. Add refrigerant. See refrigerant charge chart.
	4. Coil iced-up.	4. Manually defrost coil. Check defrost controls for malfunction.
Ice accumulating on ceiling around evaporator and/or on fan guards' venturi or blades	1. Defrost duration is too long.	1. Adjust defrost termination temp on control. See page 8.
	2. Fan delay not delaying fans after defrost period.	2. Adjust fan delay setting or replace bad sensor.
	3. Defective defrost control or sensor.	3. Replace defective control or sensor. See page 10 error codes.
	4. Too many defrosts.	4. Adjust number of defrosts.
Coil not clearing of frost during defrost cycle.	1. Coil temperature not getting above freezing point during defrost.	1. Check heater operation.
	2. Not enough defrost cycles per day.	2. Adjust control for more defrost cycles.
	3. Defrost cycle too short.	3. Adjust defrost control, defrost duration setting.
	4. Defective defrost control or sensor.	4. Replace defective component. See page 10 error codes.
Ice accumulating in drain pan	1. Defective heater.	1. Replace heater.
	2. Unit not installed properly (out of level)	2. Check and adjust if necessary. See pages 7, 8.
	3. Drain line plugged.	3. Clean drain line.
	4. Defective control.	4. Replace defective component.

PRO³ Replacement Parts

Whenever possible, replacement parts are to be obtained from one of our local authorized wholesalers. Replacement parts which are covered under the terms of the warranty statement on the back cover of this manual, will be reimbursed for total part cost only. The original invoice from the parts supplier must accompany all warranty claims for replacement part reimbursement. Heatcraft reserves the right to adjust the compensation amount paid on any parts submitted for warranty reimbursement when a parts supplier's original invoice is not provided with a claim. You may obtain information regarding local authorized wholesalers by calling Heatcraft Refrigeration Products' Replacement Parts Center at 1-800-686-7278 between the hours of 7:30 AM to 4:30 PM Central Time.

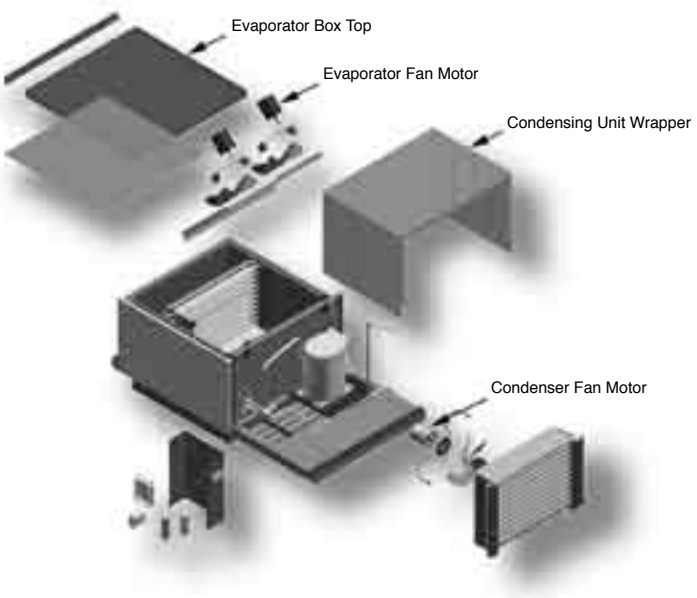


Table 10. Replacement Parts List

Part Description	Part Number	Coolers										Freezers								
		PTN024H2A	PTN029H2A	PTN040H2A	PTN047H2A	PTN047H2B	PTN063H2B	PTN072H2B	PTN099H2B	PTN099H2C	PTN128H2B	PTN128H2C	PTN019L6A	PTN021L6A	PTN021L6B	PTN031L6B	PTN044L6B	PTN052L6B	PTN052L6C	PTN069L6B	PTN069L6C
Fan Blades																					
Evaporator	22901901				1	1	2	2	3	3	3	3		1	1	2	2	3	3	3	3
Evaporator	23100501	1	1	1									1								
Condenser	22900701				1	1	1	1	2	2	2	2		1	1	1	1	2	2	2	2
Condenser	22900601	1	1	1									1								
Fan Motors																					
208/230V Evaporator	25307801					1	2	2	3	3	3	3			1	2	2	3	3	3	3
115V Evaporator	25307701				1									1							
115V Evaporator	25303201	1	1	1									1								
208/230V Condenser	25307801					1	1	1	2	2	2	2			1	1	1	2	2	2	2
115V Condenser	25307701				1									1							
115V Condenser	25300101	1	1	1									1								
Evap Fan Motor Bracket	4000104				1	1	2	2	3	3	3	3		1	1	2	2	3	3	3	3
Evap Fan Motor Bracket	23101401	1	1	1									1								
Cond Fan Motor Bracket	23103301				1	1	1	1	2	2	2	2		1	1	1	1	2	2	2	2
Cond Fan Motor Bracket	23101101	1	1	1									1								
Contactors																					
25A, 208-240V	2259996									1		1							1		1
20A, 115V	2254303				1									1							
20A, 230V	034915200					1	1	1	1		1				1	1	1	1		1	
Temperature Control																					
Defrost/Temp Control	21300401													1	1	1	1	1	1	1	1
Temp Control Freezer 115V	28916501												1								
Temp Control Cooler 208/230V	28916201					1	1	1	1	1	1	1									
Temp Control Cooler 115V	28916301	1	1	1	1																
Replacement Freezer Sensor	28912101													2	2	2	2	2	2	2	2
Replacement Cooler Sensor (Coil)	28916202	1	1	1	1	1	1	1	1	1	1	1									
Replacement Cooler Sensor (Room)	28916203	1	1	1	1	1	1	1	1	1	1	1									
Heater Limit Thermostat	5708L												1	1	1	1	1	1	1	1	1
Defrost Timer	21300601												1								
Defrost Heaters																					
115V Defrost Heaters	24751901												1								
115V Defrost Heaters	24712101													3							
230V Defrost Heaters	4312F														3	3	3				
230V Defrost Heaters	4313F																	3	3	3	3

PRO³ Small Cabinet Models Wiring. 115/1/60 voltage.

Cooler - Air Defrost Systems

Diagram 1. Wiring Diagram for PRO³ System, Air Defrost 115/1/60 models PTN024H2A and PTN029H2A.

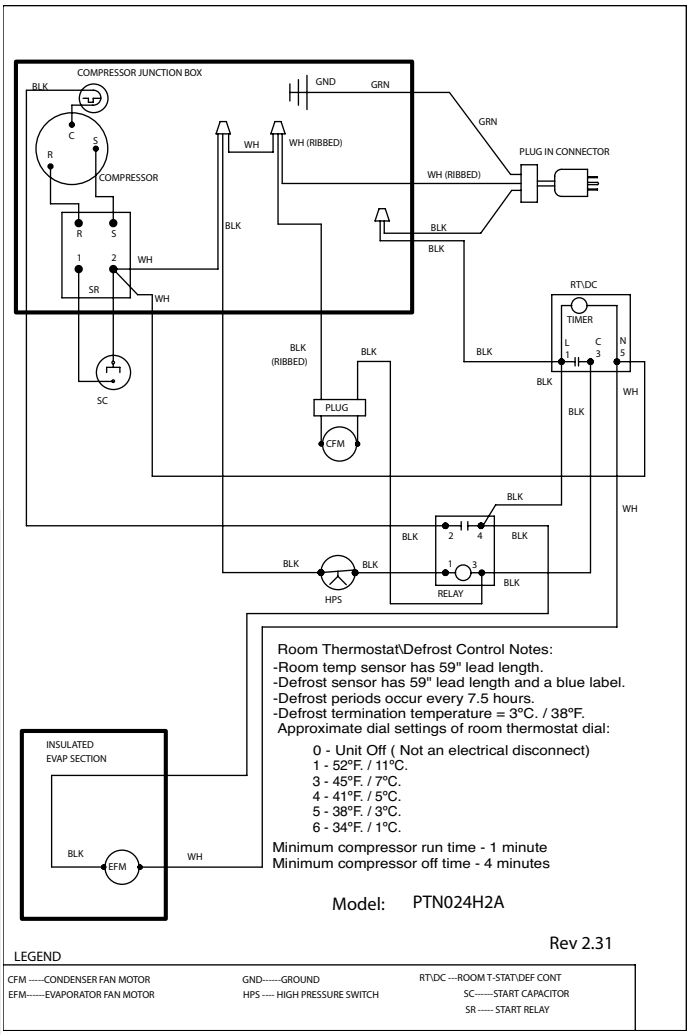
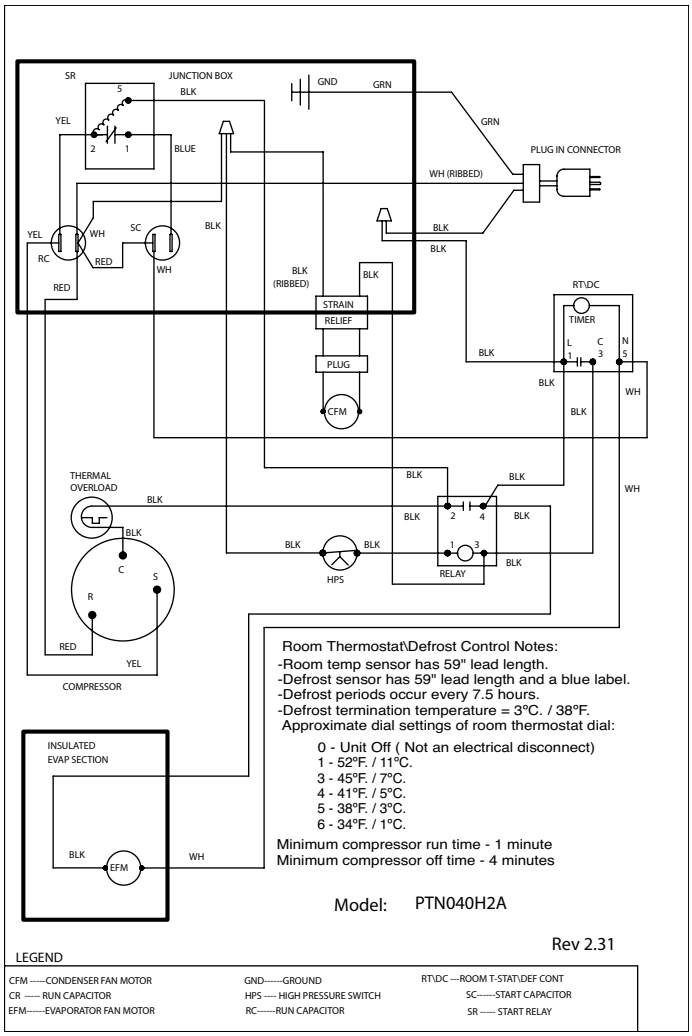


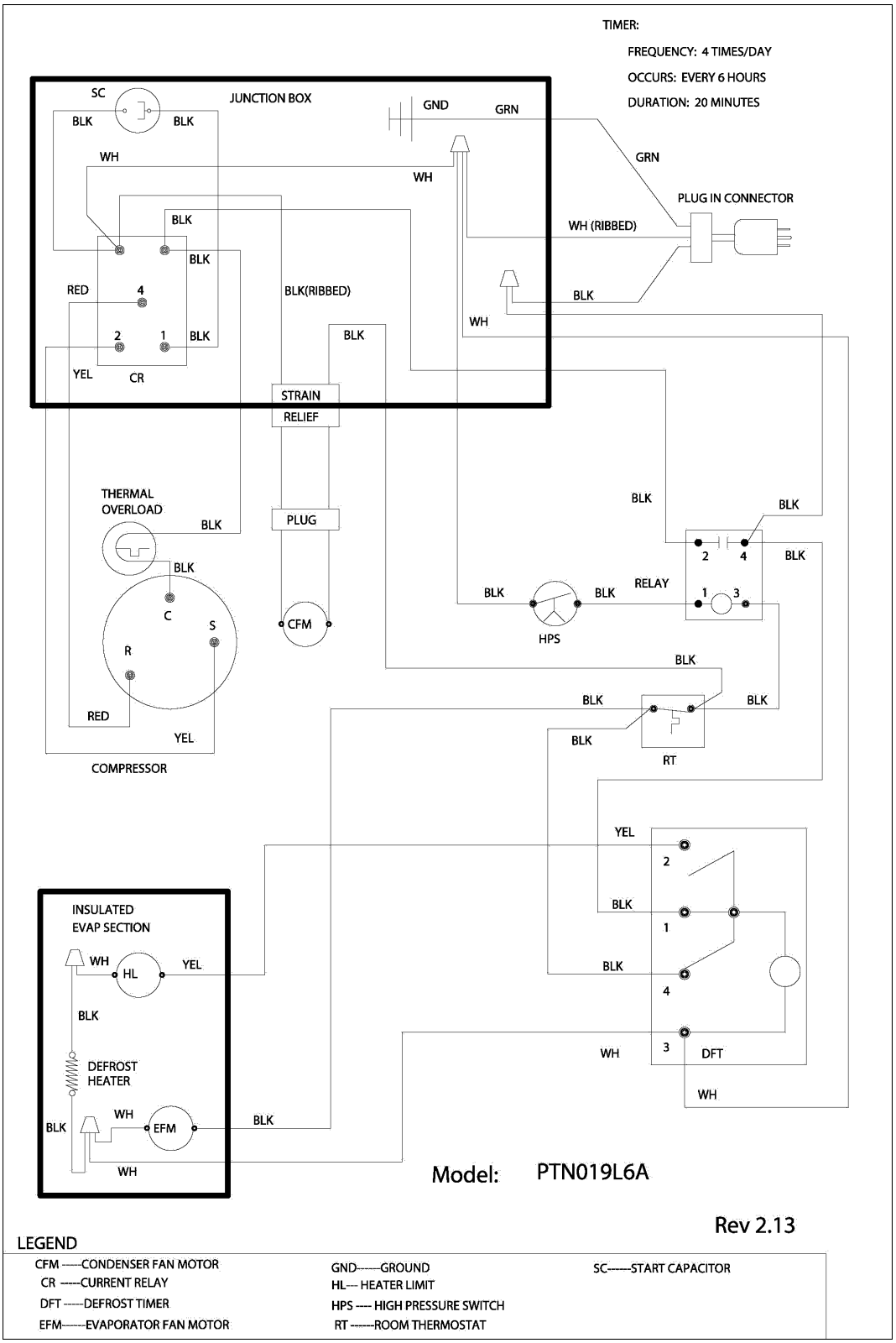
Diagram 2. Wiring Diagram for PRO³ System, Air Defrost 115/1/60 model PTN040H2A.



PRO³ Small Cabinet Models Wiring. 115/1/60 voltage.

Freezer - Electric Defrost Systems

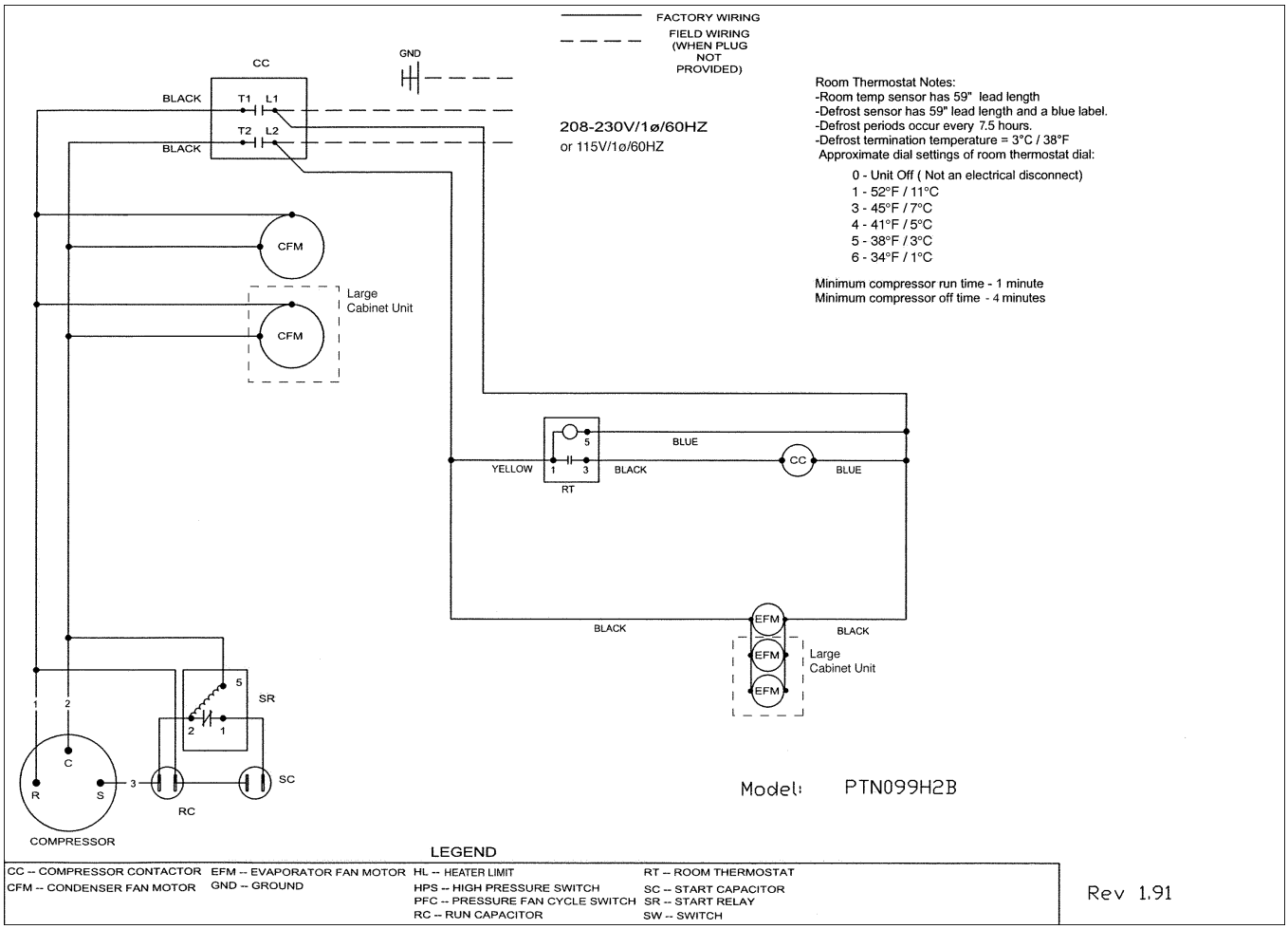
Diagram 3. Wiring Diagram for PRO³ System, Electric Defrost 115/1/60 model PTN019L6A.



PRO³ Medium and Large Cabinet Models Wiring. 115/1/60 and 208-230/1/60 voltages.

Cooler - Air Defrost Systems - Single Phase

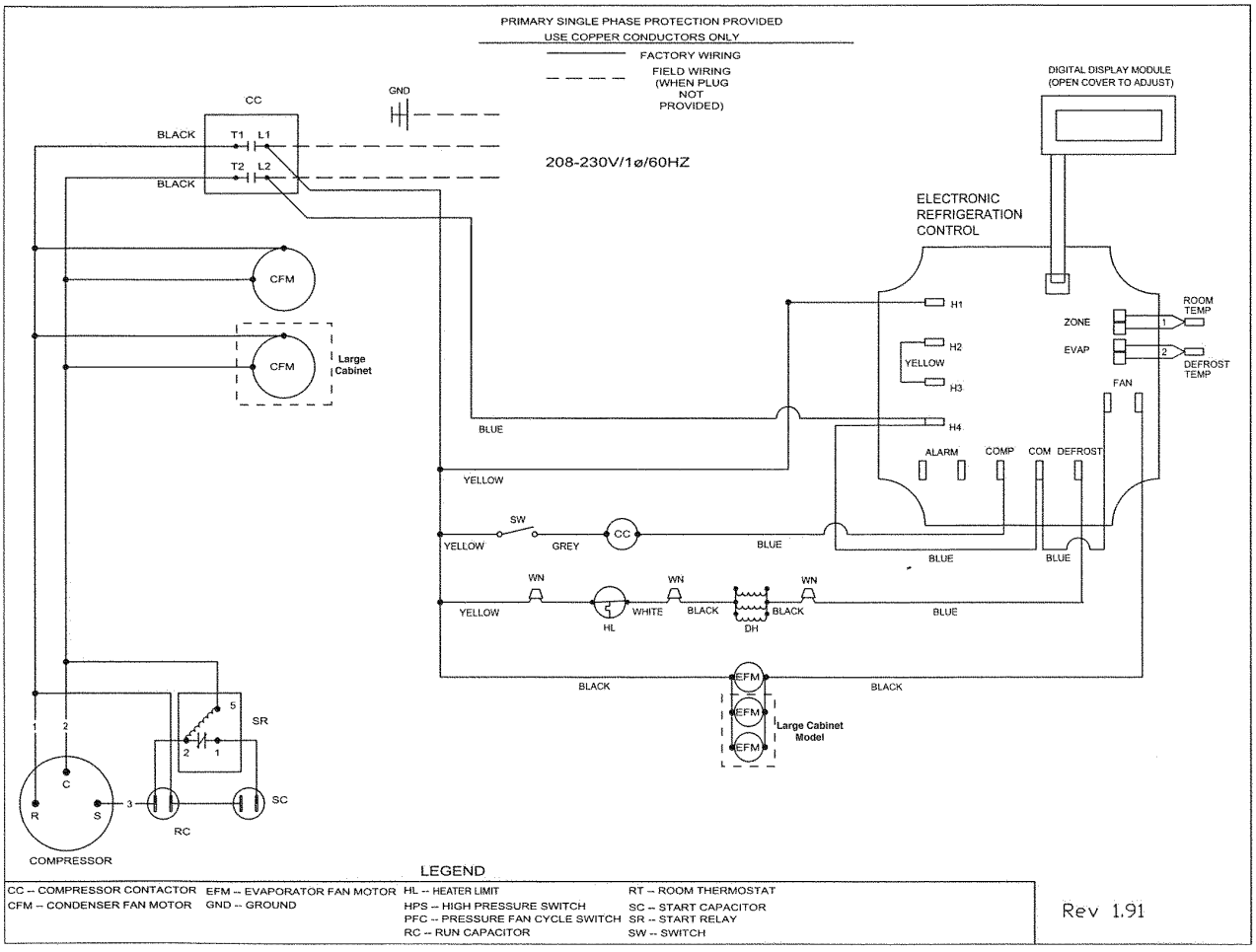
Diagram 4. Wiring Diagram for PRO³ System, Air Defrost 115/1/60 (A) and 208-230/1/60 (B): Models PTN047H2A, PTN047H2B, PTN063H2B, PTN072H2B, PTN099H2B, and PTN128H2B.



PRO³ Medium and Large Cabinet Models Wiring. 115/1/60 and 208-230/1/60 voltages Indoor and Outdoor Models

Freezer - Electric Defrost Systems - Single Phase

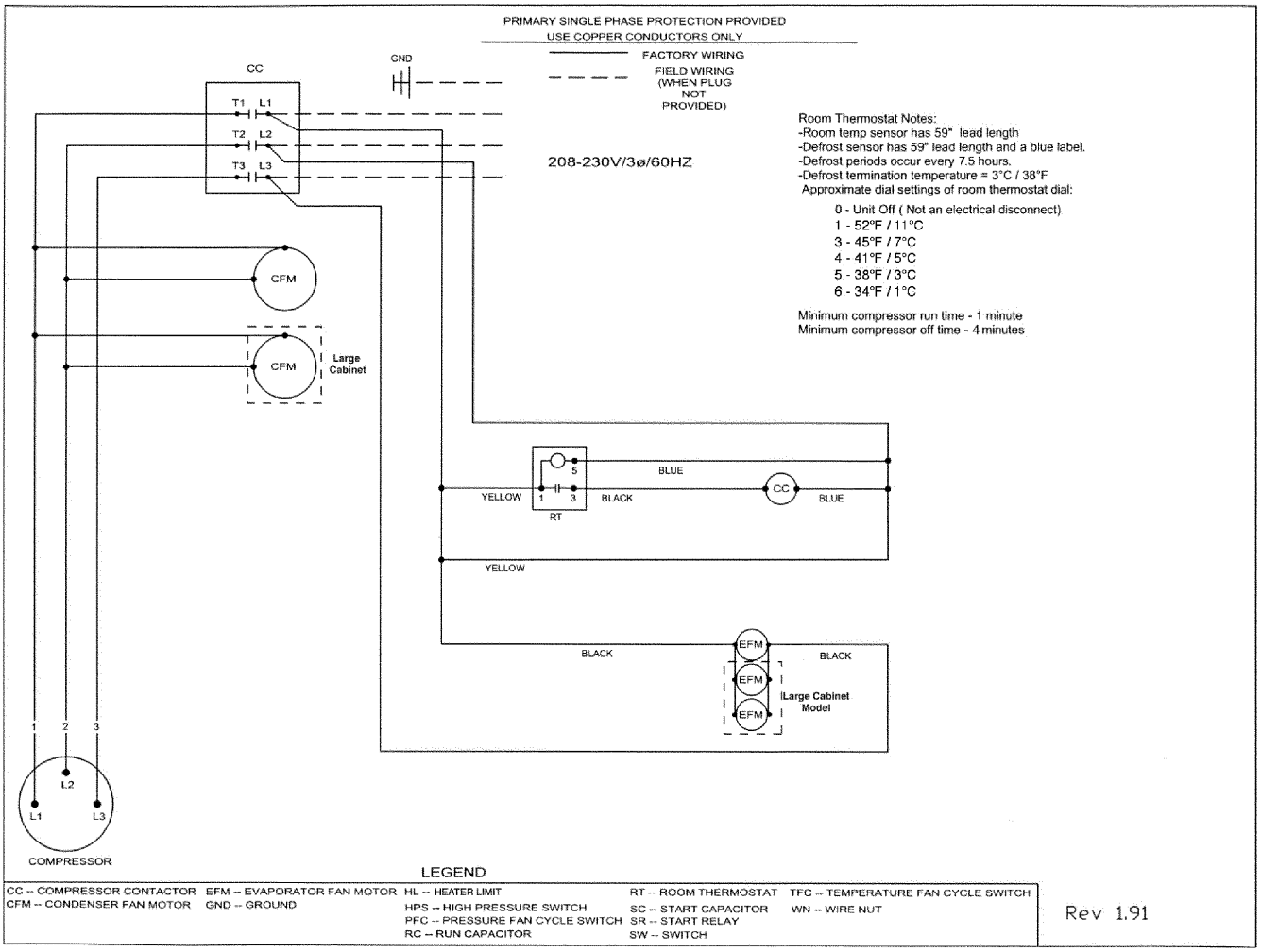
Diagram 5. Wiring Diagram for PRO³ System, Electric Defrost 115/1/60 (A) and 208-230/1/60 (B): Models PTN021L6A, PTN021L6B, PTN031L6B, PTN044L6B, PTN052L6B, and PTN069L6B.



PRO³ Large Cabinet Models Wiring. 208-230/3/60 voltage.

Cooler - Air Defrost Systems - Three Phase

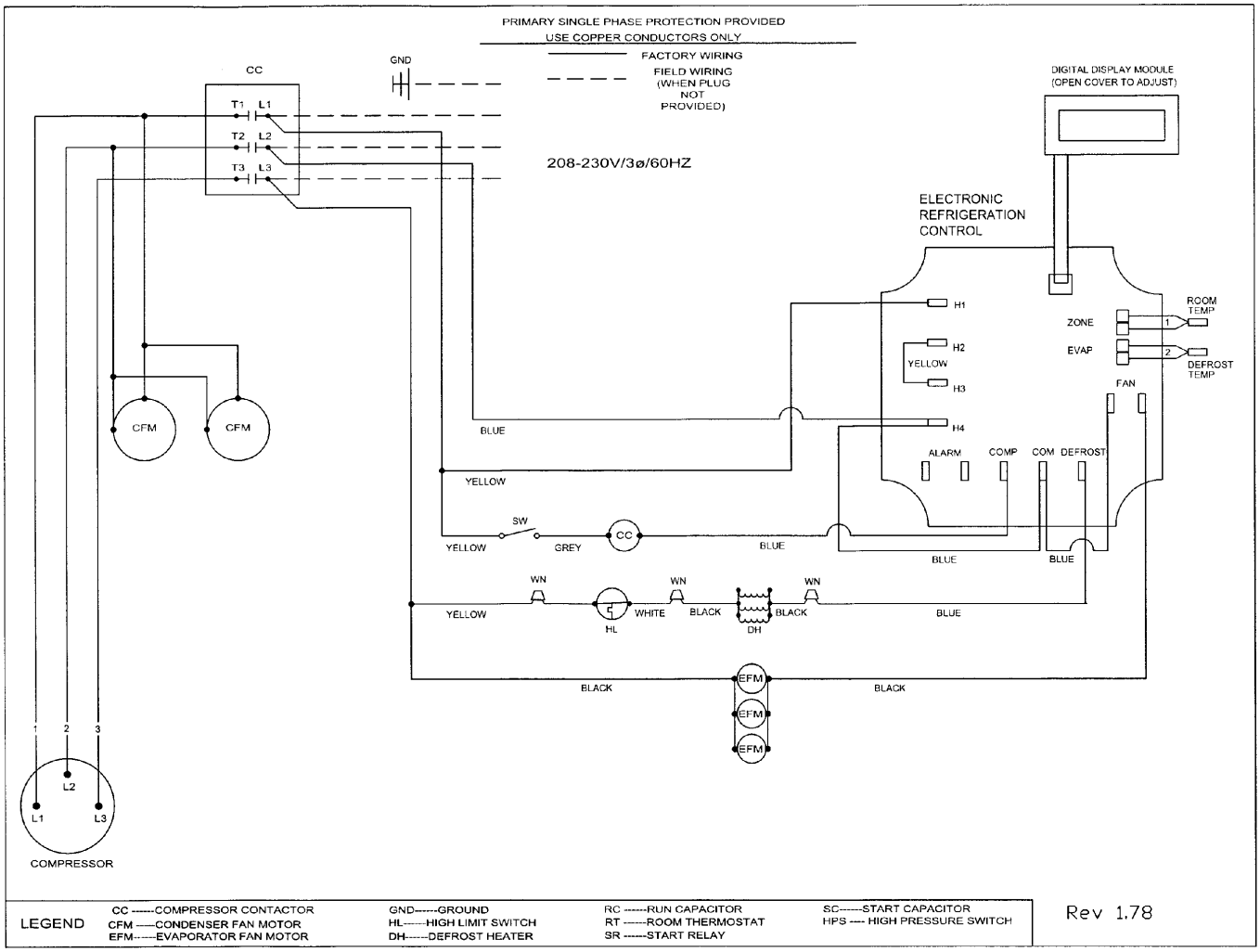
Diagram 6. Wiring Diagram for PRO³ System, Air Defrost 208-230/3/60 (C): Models PTN099H2C and PTN128H2C.



PRO³ Large Cabinet Models Wiring. 208-230/3/60 voltage.

Freezer - Electric Defrost Systems - Three Phase

Diagram 7. Wiring Diagram for PRO³ System, Electric Defrost 208-230/3/60 (C): Models PTN052L6C and PTN069L6C only.



Warranty Statement

Heatcraft Refrigeration Products LLC warrants to its direct purchasers that the PRO³ product, except Service Parts, manufactured by Heatcraft Refrigeration Products LLC shall be of a merchantable quality, free of defects in material or workmanship, under normal use and service for a period of two (2) years from date of original installation, or thirty (30) months from date of shipment by Heatcraft Refrigeration Products LLC, whichever first occurs. Service Parts, for product out of original warranty, should be so warranted for a period of twelve (12) months from date of shipment. Any product covered by this order found to Heatcraft Refrigeration Products LLC's satisfaction to be defective upon examination at Heatcraft Refrigeration Products LLC's factory will, at Heatcraft Refrigeration Products LLC's option, be repaired or replaced and returned to Buyer via lowest common carrier, or Heatcraft Refrigeration Products LLC may at its option grant Buyer a credit for the purchase price of the defective article. Upon return of a defective product to Heatcraft Refrigeration Products LLC's plant, freight prepaid, by Buyer, correction of such defect by repair or replacement, and return freight via lowest common carrier, shall constitute full performance by Heatcraft Refrigeration Products LLC of its obligations hereunder.

Hermetic compressors furnished by Heatcraft Refrigeration Products LLC are subject to the standard warranty terms set forth above, except that motor compressor replacements or exchanges shall be made through the nearest authorized wholesaler of the motor compressor manufacturer (not at Heatcraft Refrigeration Products LLC's factory) and no freight shall be allowed for transportation of the motor compressor to and from the wholesaler. The replacement motor compressor shall be identical to the model of the motor compressor being replaced. Additional charges which may be incurred throughout the substitution of other than identical replacements are not covered by this warranty.

The foregoing is in lieu of all other warranties, express or implied, notwithstanding the provisions of the uniform commercial code, the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, or any other statutory or common law, federal or state.

Heatcraft Refrigeration Products LLC makes no warranty expressed or implied, of fitness for any particular purpose, or of any other nature whatsoever, with respect to products manufactured or sold by Heatcraft Refrigeration Products LLC hereunder, except as specifically set forth above and on the face hereof. It is expressly understood and agreed that Heatcraft Refrigeration Products LLC shall not be liable to buyer, or any customer of Buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by Buyer or third parties of said products. To the extent said products may be considered "Consumer Products,' as defined in Section 101 of the Magnuson-Moss warranty-Federal Trade Commission Improvement Act, Heatcraft Refrigeration Products LLC makes no warranty of any kind, express or implied, to "Consumers," except as specifically set forth above and on the face hereof.

This equipment is designed to operate properly and produce the rated capacity when installed in accordance with good refrigeration industry practices.

The following conditions should be adhered to when installing this unit to maintain the manufacturers warranty:

(a) The power supply to the unit must meet the following conditions:

A. Three phase voltages must be +/- 10% of nameplate ratings. Single phase must be within +10% or -5% of nameplate ratings.

B. Phase imbalance cannot exceed 2%.

(b) All control and safety switch circuits must be properly connected according to the wiring diagram.

(c) The factory installed wiring must not be changed without written factory approval.

Optional Three-Year Extended Compressor Warranty

The Equipment Dealer may purchase for the Owner at the time of the original invoice of the equipment a Three-Year Limited Replacement Compressor Warranty. This entitles the owner to be reimbursed for the cost of a replacement compressor, during the third through fifth year of the life of the compressor.

The warranty program functions similarly to the standard warranty offered. When a compressor failure occurs and the unit is exchanged "over the counter" at the authorized wholesaler outlet a salvage credit is issued along with the invoice for the new compressor. Return copies of both the credit and invoice to the Equipment Dealer along with the model and serial number of the condensing unit. The Equipment Dealer will process this claim with the Manufacturer and subsequently reimburse the Owner for the cost of the new compressor.

This warranty covers the actual compressor only and does not extend to any labor, trip charges, crane rental, taxes or additional parts, refrigerant or processing/handling charges required to make the unit operational.

Since product improvement is a continuing effort,
we reserve the right to make changes in specifications without notice.

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HEATCRAFT Worldwide Refrigeration